

# NEW SPECIES OF *NAMA* (HYDROPHYLLACEAE) FROM THE CHIHUAHUAN DESERT REGION OF MÉXICO

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The genus *Nama* is a predominantly North American taxon, particularly well developed in the drier regions of the southwestern United States and northern México. Examination of the genus as represented in the Chihuahuan Desert and adjacent regions has revealed the presence of four previously unrecognized species, described herein, as well as the need for realignment of one described taxon.

## *NAMA hitchcockii* Bacon, sp. nov.

*Suffrutices* erecti vel decumbentes dense hispido-strigosi et sparse glandulares; caules copiose ramosi 20–35 cm alti caulibus veteribus in dimidio inferiore saepe nudis; folia 10–30 mm longa et 1.5 mm lata linearia valde revoluta; cymae congestae terminalaes; pedicelli validi 1–5 mm longi; sepala 9–11 mm longa linearis-lanceolata ad apicem rotundata vel acuta; corolla 9–11 mm longa tubularis debile infundibuliformis flava vel cremea; filamenta 6–8 mm longa partibus liberis partes adnatas late alatas multo brevioribus; styli 4–5 mm longi; capsulae 4–5 mm longae; semina irregulariter superficiebus multis brunnea alveolata.

TYPE: MÉXICO. NUEVO LEÓN: gypsum flats and ravines in open pinelands, about 3 mi S of Galeana; perennial with cream-color flowers, 20 Jul 1958, D. S. Correll & I. M. Johnston 19849. (HOLOTYPE: LL).

Additional specimens seen: NUEVO LEÓN: 7 mi toward Galeana from the turnoff on the Saltillo-Matchuala highway, elevation ca 7000 ft., 8 Oct 1959, Johnston & Graham 4211 (TEX); 6.7 mi E of San Roberto on Hwy. 60, along roadside, 21 Aug 1973, Bacon & Dillon 1488 (TEX); 7.2 mi E of San Roberto on Hwy. to Linares, 26 Jun 1971, Bacon 1010 (TEX); 17 mi E of San Roberto Junction and then S on dirt (mine) road for 2 mi, 24 Oct 1970, Turner & Crutchfield 6325 (TEX); mesa, altitude 5400 feet, municipality Galeana, 29 Jul 1939 Chase 7637 (MO, GH); 1 mi N of Hwy. 60 on road to Galeana, 26 Jun 1971; Bacon 1011 (TEX); 0.9 mi N of Nuevo León Hwy. 60, ca 3 mi S of Galeana, 23 Sep 1973, Atwood & Reveal 5983 (UC, left hand member on sheet); 2.5 mi S of Pueblo Galeana near jct. of road to Linares, 6 Aug 1965, Irving 147 (TEX), Stuessy 265 (TEX); along Mexican Hwy. 68, 37.7 mi north of Dr. Arroyo, 4.3 mi N of jct. 68 and Aramberri road, 24 Sep 1973, Atwood & Reveal 5992 (UC).

*Nama hitchcockii* is unique among namas in its corolla color. All populations I have visited in the field exhibited yellow corollas; most of the specimens I examined also had recorded a yellow flower color. The type specimen, however, refers to a "cream-color" flower and the Turner and

*Crutchfield* collection notes an "off-white" flower color. In both instances, I interpret the references as indicative of a yellowish cast to the flowers.

Label data and personal observations indicate *N. hitchcockii* is a gypsophile; whether obligate or facultative requires further study; but I favor the latter. It does appear, however, that the species prefers relatively barren, eroded areas essentially free of other growth, at least in the Galeana region.

The species is related to *N. johnstonii* C. L. Hitchc. (as discussed following *N. constancei*). Indeed, I previously determined the chromosome number for *N. hitchcockii* but reported the counts as *N. johnstonii* (Bacon, 1974), although noting the distinctive features of the specimens from which the number was determined.

The taxon is named in honor of C. Leo Hitchcock, to whom all students of *Nama*, present and future, are indebted for his excellent, early monograph of the genus.

#### **NAMA constancei** Bacon, sp. nov.

*Suffrutices* adscendentes vel erecti 14–30 cm alti hispido-strigosi sparse glandulares; folia 10–45 mm longa et 1.5 mm lata sessiles aliquantum carnosoincrassata, plana vel rarius debile revoluta; flores solitarii vel fasciculati 2–3-flori pro parte majore in ramis axillaribus brevibus floriferis in 0.7 superis plantae portati; pedicelli nulli vel 8 mm longi atque crassi; sepala 8–12 mm longa lineario-lanceolata subulata acuta vel rotundata; corolla 10–15 mm longa tubulo-salverformes roseolata rarius (demum?) alba; filamenta 7–11 mm longa partibus liberis partes adnatas prominente alatas multo brevioribus; styli 5–8 mm longi; capsula 3–5 mm longa; semina ovoidea brunnea reticulata et saepe excavata.

TYPE: MÉXICO. COAHUILA: ca 62 (air) mi WSW of Cuatro Ciénegas, in gypsum outcropping on northside of Sierra de los Organos, ca 5 mi SW of Cuesta del Gallo, near 26° 44' N lat, 108° 03' W long, 4400 ft; fleshy leaved perennial, flower tube white, lobes pinkish; with *Acacia*, *Fouquieria shrevei*, *Grusonia*, *Coldenia*, *Euphorbia*, *Dasylyrion*, etc., 8 Aug 1973, James Henrickson 12113 (HOLOTYPE: TEX).

Additional specimens seen: MÉXICO. COAHUILA: south part of Sierra de los Organos, approach 9.5 km E of Puerto del Gallo, then by foot S into large canyon, 1200–2100 m., 9 Aug 1973, Johnston et al. 12112 (LL); 12 km NE of Las Margaritas on the eastern most ridge of the Sierra de las Margaritas, 26° 33' 30" N lat., 102° 51' 30" W long., 1300–1400 m, 24 Sep 1972, F. Chiang, Wendt & Johnston 9508b (LL); ca 62 (air) mi SW of Cuatro Ciénegas, in long winding limestone canyon in northside of Sierra de Organos, 26° 41' N lat., 103° 03' W long., 5300 ft, 8 Aug 1973, Henrickson 12157 (TEX); ca 32 (air) mi NE of Tlahualilo, in the NW portion of the Sierra de las Delicias, in the first canyon S of the Puerto de las Sardines, 26° 22' N lat., 103° 06' W long., 4400 ft, 9 Aug 1973, Henrickson 12211 (TEX); ca 18 (air) mi NE of Tlahualilo, in the Sierra de Tlahualilo, ca 9 (air) mi N of Los Charcos de Risa, 26° 17' N lat., 103° 14' W long., 4500 ft, 29 Sep 1973, Henrickson 13714 (TEX); ca 1 km W of Las Delicias at and near spring, 26° 14' N lat., 102° 49' 30" W long, 1000–1300 m, 24 Mar 1973, Johnston, Wendt & Chiang 10385e (LL), 27 Aug 1971, Henrickson 6036 (TEX), 12 Aug 1973, Henrickson 12248 (TEX); Cañon del Agua Grande, in the Sierra del Sobaco, a few km W of Las Delicias, 2 Oct 1942, Stewart 2814 (GH); 1 km SE of Rancho del Coyote, 25 Sep 1942, Stewart 2752 (GH), 2754 (GH).

*Nama constancei* is a marked gypsophile, for gypsum is noted as the substrate for all cited collections save one. The exceptional specimen, *Henrickson 13714* (TEX), is atypical in other ways as well and is included here with reluctance and uncertainty. The collection is reminiscent of *N. johnstonii* in some respects but lacks the pubescence and flower arrangement of that taxon; indeed, it resembles *N. hitchcockii* in those aspects. However, it lacks the overall robustness and woodiness typical of *N. hitchcockii* and flower color is recorded as "pink-white". The collection was taken in the Sierra de Tlahualilo, which is west of the relatively tight group of mountain ranges from which the remaining collections of *N. constancei* were taken. The collection may represent yet another underscribed taxon.

The species is named in honor of Lincoln Constance, long-time student of the Hydrophyllaceae.

Among the Chihuahuan Desert *namas* there occurs a distinctive, presumably interrelated group of perennial, essentially linear leaved species, including *N. flavescens* Brandeg., *N. canescens* C. L. Hitchc., *N. stenophyllum* Gray ex Hemsl., *N. carnosum* (Woot.) C. L. Hitchc. and *N. johnstonii* C. L. Hitchc. With one exception the species are edaphically similar in that they exhibit a marked predilection for, if not an obligate requirement for, gypseous soils. Generally allopatric, these species occupy gypseous flats and outcroppings of lower mountain slopes from northern San Luis Pososí to southeastern New Mexico. *Nama johnstonii*, the exceptional taxon, is a reportedly limestone endemic known only from cliffs and outcroppings in the Sierra de Jimulco, Sierra de Parras and Sierra de la Fragua in southwestern Coahuila.

*Nama hitchcockii* and *N. constancei* are to be included in this linear leaved grouping and are to be positioned near *N. johnstonii*. All three species are similar in habit, being woodier and shrubbier than other species in the group. Both *N. constancei* and *N. hitchcockii* differ from *N. johnstonii* in being gypsophiles, although *N. hitchcockii* may prove to be facultatively so. Distributionally, *N. constancei* is found in the same general area occupied by *N. johnstonii*, but at lower altitudes; *N. hitchcockii* is disjunct from the former two (closest known localities about 100 km. to the east), occurring in the more montane region from Galeana, Nuevo León south to near Aramberri, Nuevo León.

While firm relationships among these three species have yet to be defined, certain features, particularly those of seed coat morphology and flower arrangement, hint at a more intimate relationship between *N. hitchcockii* and *N. johnstonii*, with *N. constancei* their more distant kin. Furthermore, seed features of the former pair of species suggest that they are related to *N. stenophyllum* and *N. canescens* while seeds of *N. constancei* are more reminiscent of *N. carnosum*. All things considered, *N. hitchcockii*, *N. constancei* and *N. johnstonii* may prove to be the basal elements of the linear leaved perennials.

**NAMA turneri** Bacon, sp. nov.

*Herbae perennes humiles ad basem lignae, caules annui hirtello-hirsuto-hispidi glandularesque 8–15 cm longi; folia 5–17 mm longa 1.5–6 mm lata oblanceolato-spatulata, ad apicem obtusa ad basem attenuata plana vel debile revoluta; flores solitarii prope caules vel inflorescentiae laxae pauciflorae terminales; pedicelli saepe tenues 1–2 mm longi; sepala 4–7 mm longa, linearo-lanceolata vel linearo-oblanceolata ad apicem acuta; corolla 6–8 mm longa late hypocrateriformes lavandulo-purpurea vel alba; filamenta 2–3.5 mm longa partibus liberis partes adnatas anguste alatas brevioribus vel longioribus; styli 1.5–2.5 mm longi; capsula 3–4 mm longa; semina ovoideo-fusifformes flava reticulata vadose excavata.*

TYPE: MÉXICO. SAN LUIS POTOSÍ: 6.5 mi E of Hwy. 57 on the road to Cerritos, along roadside near small group of houses, rocky-clay soil; caespitose perennial with large tap root, corolla blue-purple, 25 Jun 1971, Bacon 991 (HOLOTYPE: TEX; ISOTYPES: to be distributed).

Additional specimens seen: MÉXICO. NUEVO LEÓN: 37 mi N of Matehuala on Hwy. 57 (Km 64), 26 Jun 1971, Bacon 1006 (TEX); 7 mi N of San Roberto on Hwy. 57, 26 Jun 1971, Bacon 1015 (TEX). SAN LUIS POTOSÍ: 0.2 mi W of Hwy. 57 (Km 64), 26 Jun 1971, Bacon 1006 (TEX); 7 mi N of San Roberto N of Hwy. 57 on road to Cedral, 26 Jun 1971, Bacon 1003 (TEX).

Yet another marked gypsophile, *N. turneri* is to be associated with other *namas* having yellow, ovoid-fusiform seeds, particularly *N. hispidum* Gray and *N. stevensii* C. L. Hitchc. var. *gypsicola* (I. M. Johnst.) Bacon. While *N. turneri* shares a similar edaphic preference and habit with var. *gypsicola*, it differs from that taxon in its decidedly perennial habit and its broader, apically obtuse leaves. Although lacking the prostrate habit and perennial duration of *N. turneri*, it is probable that *N. hispidum* will prove to be the closest relative of this species.

The taxon is named to honor B. L. Turner, able and ardent student of the gypseous flora of North America, who first introduced me to *Nama* and the delights of gypsum endemism.

**NAMA rzedowskii** Bacon, sp. nov.

*Herbae annuae vel debile perennes sparse vel modice hispidulae glanduliferaeque; caules tenues adscendentes 3–6 cm longi; folia opposita 5–20 mm longa 2–4 mm lata oblanceolato-spatulata ad apicem rotunda ad basem attenuato-subpetiolata plana vel debile revoluta; flores solitarii vel binati prope caules; pedicelli 2–4 mm longi; sepala 2.5–4.5 mm longa ad 1 mm lata lanceolata vel oblanceolata ad apicem acuta; corolla 4–4.5 mm long tubulares purpurea; filamenta 2–2.5 mm longa partibus liberis partes adnatas longioribus; styli ad 1 mm longi; capsulae 2.5–3 mm longae; semina irregulariter ovoidea vel debile multilaterales brunnea reticulata.*

TYPE: MÉXICO. SAN LUIS POTOSÍ: 9 km E of Rioverde, on the highway to Rayón, alluvial plains with halophytic grasses and *Prosopis*, 1000 m, plant annual, flowers light purple, 16 Sep 1967, Rzedowski 24777 (HOLOTYPE: UC, lower left hand member on sheet).

The opposite leaves of this taxon point to a relationship with *N. serpylloides* Gray ex Hemsl., the two species being the only *namas* with such a phyllotaxy. Moreover, the small capsules with short styles as well as minor features of the seeds of *N. rzedowskii* are reminiscent of *N.*

*serpylloides*. Nevertheless, the two species are quite distinct. *Nama rzedowskii* is a diminutive, purple flowered annual, possibly a weak perennial, and lacks the dense, often velvety pubescence of its strongly perennial, pink flowered relative. The relationship may prove to be more distant than the beguiling leaf arrangement would suggest.

The species is named for Dr. Jerzy Rzedowski, who discovered the only known population of the species.

NAMA STEVENSII C. L. Hitchc. var. *gypsicola* (I. M. Johnst.) Bacon comb. nov.—Based on *Nama hispidum* Gray var. *gypsicola* I. M. Johnst. J. Arnold Arbor. 22: 162. 1941.

After additional study, I here follow up my previous suggestion (Bacon 1974) and align var. *gypsicola* with *N. stevensii*.

I thank Dr. Marshall C. Johnston for providing the latin diagnosis and Dr. Lincoln Constance for calling the Rzedowski collection to my attention.

#### REFERENCES

- BACON, J. D. 1974. Chromosome numbers and taxonomic notes in the genus *Nama* (Hydrophyllaceae). *Brittonia* 26: 101–105.